

PATENT

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for

EYEGLOSS CLEANER

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EYEGLOSS CLEANER

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention pertains to devices for cleaning eyeglasses, and is particularly applicable to small, portable, self-contained devices for cleaning
5 eyeglasses.

Description of the Related Art

It can be appreciated that eyeglass cleaning apparatuses have been in use for years. Typical eyeglass cleaning devices include a spray dispenser,
10 which may or may not be attach to the main device, together with cleaning cloths or pre-wetted cloths attached to rollers or arms.

However, the main problem with many conventional devices and methods is that the spray dispenser and cloth are two separate items that have to be carried around by the user. This is very unpractical. The pre-wetted cloths have
15 to be taken out of a package first, and then when the cleaning is completed, the user is required to store the package and dispose of the dirty cloth.

However, even when conventional devices include all necessary components in a single container, they often still are bulky and, in many aspects, difficult to use and/or to produce. Typical examples are described in U.S. Patent
20 4,347,010 ("Cleaning Device for Eyeglass") and in U.S. Patent 5,222,268 ("Pocket Eyeglass Cleaner Apparatus"). For example, many prior art devices, due to the way they are constructed, can not be manufactured in a suitable industrial manner.

Often, the conventional eyeglass-cleaning devices also have a problem
25 with their cleaning-liquid systems. When pointing a conventional device in a certain position, for example downwards, cleaning liquid often will start leaking.

Such conventional devices typically don't have an adequate system of sealing their liquid containers. In addition, it often is not possible for the user to use up all of the cleaning liquid in a conventional device. This poses a problem
30 for when the liquid system has to be refilled. In addition, conventional devices typically don't have a system where the liquid container can be replaced. Still

further, conventional devices often can't be dosed properly. That is, there often is no control over how much liquid is transferred.

Another problem is that many conventional eyeglass cleaning devices don't have an easy-to-access and adequate system of replacing the wiping
5 components. In fact, with many such devices, it is almost impossible to replace the wiping components. Therefore, most conventional wiping components are attached onto a plate or disc, which is then attached to the remainder of the device.

Conventional devices are also laborious in use because they often can't
10 be used immediately. Instead, they usually first have to be pulled and placed in a certain position before they can be used.

Another problem is that most conventional devices are not very handy in use to place, position and clean the eyeglass. For example, accumulation of cleaning liquid at the edge of the eyeglass-frame is a common problem with
15 many conventional devices.

In short, a suitable, practical, user-friendly and industrially manufacturable solution and system of replacing the wiping components is missing in the conventional devices.

SUMMARY OF THE INVENTION

20 The present invention addresses the foregoing problems in a number of different ways, according to the various embodiments described below, such as by combining all the necessary components into a portable and easy-to-use device, utilizing arms that are spring-biased toward an outward orientation, utilizing particular pump and/or fluid reservoirs systems (e.g., replaceable
25 capsules filled with a cleaning liquid).

Thus, in one aspect the invention is directed to an apparatus for cleaning eyeglasses that includes a housing, a fluid reservoir, and evacuation means for pressurized evacuation of fluid out of the fluid reservoir. Two arms are attached to the housing at their proximal ends and, in their nominal orientations, extend at
30 an outward angle from the housing and from each other. Each arm has a wiping pad at its distal end and is spring-biased into its nominal orientation, such that the wiping pads may be compressed toward each other.

By utilizing outwardly spring-biased arms in the foregoing manner, the device of the present invention typically provides easy access to the wiping components, often making it relatively easy to replace the wiping components by obviating the need to manually separate the wiping arms prior to replacing the wiping components. This can also make it possible to use replaceable wiping components (e.g., fabric with soft pad, etc) without any support plate, disc, etc. being attached onto the wiping component. Generally, this is also highly desirable for a suitable industrial manufacturing of these wiping components.

Moreover, by virtue of this feature of the present invention, often the only thing that has to be done is to pull the device out of a provided storage container and then it is ready to be used. This feature of the present invention can enable the user to easily compress the arms over the eyeglass and, in certain embodiments, creates enough room to easily push with one finger on top of an atomiser button or similar device for applying the cleaning fluid.

When finished cleaning, the arms typically open automatically, so that the cleaning device can be easily removed from the eyeglass, without creating an accumulation of cleaning liquid at the edge of the eyeglass-frame, which often is a problem in many conventional devices. As a result, a better feel and freer motion onto the eyeglass often is obtained.

In addition, as described in more detail below, certain devices according to the present invention include configurations of wiping components and ways to replaceably attach them that address many of the shortcomings in the prior art that have been described above.

In another aspect, the invention is directed to an apparatus for cleaning eyeglasses that includes a housing, a fluid reservoir (preferably a disposable capsule filled with a cleaning liquid), a pump coupled to the fluid reservoir for pumping fluid out of the fluid reservoir, and two arms attached to the housing at their proximal ends and extending from the housing. Each arm has a wiping pad at its distal end and is spring-biased into a nominal orientation. Also, according to this aspect of the invention, the fluid reservoir is substantially shape-retaining and is provided with a burstable seal.

By utilizing a substantially shape-retaining fluid reservoir having a burstable seal, the present invention often can provide a very easy, accessible

and practical, efficient, industrially applicable system of adequately replacing a liquid capsule.

The foregoing summary is intended merely to provide a brief description of the general nature of the invention. A more complete understanding of the invention can be obtained by referring to the claims and the following detailed description of the preferred embodiments in connection with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

Figures 1A-C illustrate perspective views of an eyeglass-cleaning device according to a first representative embodiment of the invention, with the cover on, partially removed and then fully removed, respectively.

Figures 2A and 2B illustrate a side elevational view and a front elevational view, respectively, of the eyeglass-cleaning device according to the first embodiment of the invention.

Figure 3 shows an exploded perspective view of the eyeglass-cleaning device according to the first embodiment of the invention.

Figure 4 illustrates a cross-sectional front view of the eyeglass-cleaning device according to the first embodiment of the invention, with the cover on.

Figure 5 illustrates a cross-sectional front view of the eyeglass-cleaning device according to the first embodiment of the invention, with the storage cover removed.

Figures 6A-C show exploded perspective cut-away side views of three different respective configurations of the wiping components.

Figures 7A-C show cross-sectional side views of the three different respective configurations of the wiping components.

Figure 8A illustrates a first representative embodiment of a wiping component assembly having no detachable components; Figure 8B illustrates an exploded view of the detachable components of a second representative embodiment of a wiping component assembly; Figure 8C illustrates an assembled view of the second representative embodiment of a wiping component assembly; Figure 8D illustrates an exploded view of the detachable components of a third representative embodiment of a wiping component

assembly; Figure 8E illustrates an assembled view of the third representative embodiment of a wiping component assembly.

Figure 9 illustrates a rear perspective view of an eyeglass-cleaning device according to the first embodiment of the present invention, in use, with liquid
5 being atomized or sprayed onto the spectacle lens of an eyeglass.

Figure 10 illustrates a perspective view of an eyeglass-cleaning device according to the present invention in use, with the spectacle lens of an eyeglass being cleaned by the wiping components of the device.

Figures 11A-C illustrate perspective views of a device according to a
10 second embodiment of the invention, with the cover on, partially removed and then fully removed, respectively.

Figure 12 provides an exploded view of the device according to the second embodiment of the invention.

Figures 13A and 13B illustrate rear and side elevational views of the
15 device according to the second embodiment of the invention.

Figure 14 shows a perspective view of the device according to the second embodiment, with liquid is being atomised from the wiping component onto both sides of a spectacle lens.

Figure 15A shows a top perspective view of a combination of a wiping
20 component and a backing plate; Figure 15B shows a top perspective view of the combination wiping component and backing plate while being slid into a wiping arm; Figure 15C shows a bottom perspective view of the guiding section of a wiping component backing plate, partially inserted into a wiping arm; and Figure 15D shows a bottom perspective view of the guiding section of a wiping
25 component backing plate, fully inserted into a wiping arm.

Figures 16A-C illustrate the following perspective views of a device according to a third representative embodiment of the invention: a front view with the wiping arms partially folded open and backing plates attached thereto, a rear
view with the wiping arms closed but no backing plates attached, and a rear
30 view with the wiping arms open but no backing plates attached, respectively.

Figure 17A illustrates a cross-sectional view and Figures 17B-D illustrate perspective views of a wiping component and a backing plate having a hinged retention component for securing the wiping component.

DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Generally speaking, the present invention concerns a portable eyeglass-cleaning device for eyeglasses, such as device **1** shown in Figures 1A-C. As shown in Figures 1-5, device **1** preferably includes a storage cover **30** that may
5 be slidably attached to or removed from the remainder of device **1**. Upon removal of storage cover **30**, wiping arms **24** preferably automatically pivot (or bend) outwardly, due to a biasing of arms **24** that is described in more detail below. At the end of each wiping arm **24** is a wiping component **4** that can be used to clean an eyeglass spectacle (shown in Figures 9 and 10). Between
10 arms **24** is an atomizer button **13** for spraying cleaning fluid onto the eyeglass spectacle.

In another embodiment, shown in Figures 11-14, a portable eyeglass-cleaning device **38** is provided. The device **38** is similar to device **1**, but rather than having a spraying nozzle (e.g., atomizer button **13**) that is disposed
15 between the wiping arms, in the present embodiment device **38** has hoses **56** that direct the cleaning fluid through the wiping arms **40** and either into or through wiping components **4**. In this way, the cleaning fluid can be sprayed onto the eyeglass spectacle directly from wiping components **4**, as shown in Figure 14. Alternatively, the cleaning fluid may be pumped into wiping
20 components **4** (not shown), thereby wetting them so that they can be used to wipe the eyeglass spectacle.

In a still further embodiment, shown in Figures 16A-C, an eyeglass-cleaning device **110** has wiping arms **140** that open and close against each other by using a structure that is hinged along one edge. In this embodiment, the
25 cleaning fluid emission can be configured as discussed herein with respect to the first embodiment (e.g., device **1**), as discussed herein with respect to the second embodiment (e.g., device **38**), or in any other manner.

The following discussion begins with a description of the common components and then generally covers the first through third embodiments in
30 order. However, it should be understood that many of the features and components, as well as the possible variations in the same, will be common across all three embodiments.

The size of the device (e.g., **1**, **38** or **110**) preferably is small enough so it can easily be placed in a trousers pocket. For example, the device when closed might have dimensions of approximately: 4 inches by 1.2 inch by 1 inch.

Description of the Different Parts and the Relation Between Them.

5 The following describes the components of a representative eyeglass-cleaning device according to the present invention. Reference is made to Figures 3 and 4, which illustrate the eyeglass-cleaning device **1**.

- **4** Two preferably replaceable wiping components, closed or with a hole in the middle. Preferably, each wiping component is comprised of two pieces of
10 fabric, reinforced paper cloth or other suitable wiping material **31** and **32**, and a soft pad with an oblique section that is captured inside the two wiping pieces **31** and **32**. They are fixed, replaceably or permanently, onto the plates **18**.
- **6** A sealing cap is placed on top of the capsule **12**. It includes a flat circular
15 cap **6** with a hose **5** in the middle, running all the way to the bottom of the capsule **12**. See Figures 3 and 4. The capsule **12**, sealing cap **6** and hose **5** can be separate parts or one integrated part, preferably manufactured with injection, blow, or rotation molding. The liquid capsule **12** is filled with cleaning liquid on an industrial base; then a sealing cap **6** of a suitable burst-
20 able material is placed and fixed over or on top of the capsule **12**. By inserting and pushing capsule **12** into casing **10**, the burstable top section will interconnect and burst into the lower section of the pump **20**. Now the pump **20** is connected with the inside of the capsule **12**. Thereafter, liquid can flow from the capsule **12** into the pump **20** so it can be pumped up. Although the
25 configuration of the capsule **12** is described in a preferred embodiment, it is not intended to be restrictive. Other suitable manufacturing and construction options may be used, departing from the same system. Also the hose **5** and sealing cap **6** can be one molded part that is placed onto the capsule **12** after it is filled with a cleaning liquid. A smaller sealing cap **6** made from a
30 burstable material (e.g., a thin film type of material, a special developed cap with an incision, or thinner material section, burst-able plastic, aluminium foil, or any other suitable sealing burst-able material or construction) is then put on top in the middle of capsule **12** or cap **6** to close the capsule **12** with liquid

in it. The lower section of the pump **20** will puncture the burstable seal **6** when capsule **12** is inserted.

- **8** A closing cap is placed onto the lower side of the casing **10**, to seal off the capsule **12**, after the capsule **12** has been inserted. Closing **8** may, for
5 example, be screwed into the bottom portion of casing **10**.
- **10** A casing comprised of a hollow casing wall unit with two open ends. The casing **10** preferably becomes narrower at the top. In this narrower section, a small preferably tubular pump **20** is fixed. At the upper right and left side of the casing **10**, there are four limbs **19**. In each of them there is a small hole **9**.
10 The two arms **24** or **40** fit into these sections, via limbs **2**, where they can pivot.
- **11** Two small springs that are positioned on alternate sides of the upper casing **10**. They are held in place by the two arms **24**, and the casing **10**. This biasing effect can also be achieved by integrating a pliable or spring-like
15 construction into casing **10** and wiping arm **24** (or **40**). These parts **10** and/or **24** (or **40**) preferably then both would be injection-molded parts. Such a system could replace the two springs **11**. Still further, a separate but integrated spring (e.g., a leaf spring) may be provided on casing **10** and/or on wiping arm **24** (or **40**).
- **12** A replaceable and/or removable (preferably disposable) capsule or other
20 container containing a cleaning liquid. It includes a hollow casing with one open end (which is sealed by sealing cap **6**). The capsule is inserted into the casing **10** and connects with the lower end of the pump **20**. In the preferred embodiments of the convention, container **12** is rigid or semi-rigid, thereby
25 substantially shape-retaining. For purposes of the present discussion, it will be assumed that container **12** is a capsule with a burst-able top section **6**.
- **13** An atomiser button that is placed and fixed on top of the pump **20**. Such button **13** preferably is of the type commonly used on top of small perfume bottles.
- **14** A cap/container for providing access to the lower portion of the eyeglass-
30 cleaning device; if configured as a container, it may be used to store spare wiping components **4**.

- **18** Two plates at the distal ends of arms **24** that are used to retain the replaceable wiping components **4**. See, e.g., Figures 6-8 and 15.
- **20** A small tubular pump that fits into the narrow open upper end of the casing **10**. In the preferred embodiments of the invention, the pump is a manual pump, of the type commonly used in small perfume bottles. However, it may instead be configured as an electric pump. Still further, pump **20** may be omitted entirely in favor of an aerosol or similar pressurized container **12**.
- **22** A cover/container that is placed over casing **10** and is detachably clicked with snap-fit engagements **7a** and **7b** onto casing **10**. This can help to seal off and attach the liquid capsule **12** into casing **10**. Cover/container **22** preferably has a section inside that captures capsule **12**, and where capsule **12** can be replaceably fixed.
- **24** Two pivoting arms, each having at its upper end, an inwardly extending section **17** to attach plate **18**. At the lower end of these arms **24** there are small preferably cylindrical extending limbs **2**. These are clicked into the holes **9** of the casing **10**.
- **30** A storage cover that is placed over the cleaning device **1** when not in use. When this storage cover **30** is pulled off, it preferably can be placed onto section **3** of cover/container **22** while using the device (preferably being held in place by an interference fit between the two components). Preferably, there are a number of evaporating holes **61** in storage container **30**.

As indicated above, device **1** includes a casing **10** where a replaceable capsule **12** filled with a cleaning liquid is inserted. A pump **20** is fixed inside the upper casing. On top of this pump there is an atomiser button **13**. The arms **24** are clicked into the designated holes **9** in the limbs **19**, so that arms **24** can pivot. Two springs **11** are captured between the casing **10** and the two arms **24**. When the protection cap **30** is pulled of, the two arms **24** open automatically due to the biasing effect of the springs **11**. This allows the arms **40** to be placed over the eyeglass very easy. When the atomiser button **13** is pointed toward the eyeglass and pressed, cleaning liquid is atomised onto the eyeglass. The two arms **24**, with the replaceable wiping components **4**, are placed and pressed onto the eyeglass. Then the user makes a rotating movement to clean the eyeglass.

In addition, the following components are provided with respect to eyeglass-cleaning device **38**, with reference to Figures 12-14.

- Button **39** (replacing button **13**) that includes a circular outer wall, a closed upper end, and an open lower end with three hollow channels: one
5 positioned longitudinally onto the pump **20** and then splits into two open channels that terminate into outlets to which hoses **56** may be attached.
- Arms **40** (replacing arms **24**) that preferably have a conduit for running hoses **56** and have the other features described below for permitting cleaning fluid to be omitted from their distal ends.
- 10 • **56** Two small hollow flexible hoses that run and are attached from the button **39** to the atomiser and nozzle mechanism **62** in the arms **40**.
- **58** Two very small caps, each with an even smaller hole in it of the type commonly used in small perfume bottle buttons that functions as an atomizer,
15 are placed into the atomiser and nozzle section **62** of each arm **40**, allowing the cleaning agent to run through this atomiser, being atomised, drop-wise emitted in the wiping components, or very softly onto both sides of the eyeglass lens.

As indicated above, device **38** also includes a casing **10** where a replaceable capsule **12** filled with a cleaning liquid is inserted. A pump **20** is fixed
20 inside the upper casing. On top of this pump there is an atomiser button **39** that has three open channels to pump up the liquid and divide it into two separate channels. Connecting with these two channels, there are two small flexible hoses **56**. These flexible hoses run from the button to the atomiser mechanisms **62** in the two arms **40**. These arms are clicked into the designated holes **9** in the
25 casing **10** (but in this embodiment omitting limbs **19**), so that arms **40** can pivot. Two springs **11** are captured between the casing **10** and the two arms **40**. When the protection cap **30** is pulled of, the two arms **40** open automatically due to the biasing effect of the springs **11**. This allows the arms **40** to be placed over the eyeglass very easy. The atomiser button **39** is pressed and cleaning liquid goes
30 from the pump **20** through the hoses **56** into the atomiser mechanisms **62**, and then in or through the two wiping components **4** onto both sides of the eyeglass. The two arms **40**, with the replaceable wiping components **4**, are placed and

pressed onto the eyeglass. Then the user makes a rotating movement to clean the eyeglass.

Production and Materials.

Most of the components in the devices according to the present invention are preferably manufactured with injection, rotation or blow molding .Any or all of such components may be constructed of various types of plastics, composite or any other well-known material. However, the material choices are to be considered in all respects as illustrative and not restrictive

The Wiping Components.

The present invention contemplates a wide variety of different configurations for the wiping components **4** and a wide variety of different ways for attaching the wiping components **4** onto the arms **24** or **40**. Three such configurations **60**, **80** and **100** are described below.

Configuration 60:

As shown in Figures 6-8, wiping component **60** preferably is comprised of two pieces of fabric, reinforced cloth or other suitable wiping material **31** and **32**. A soft pad, sponge material, or other suitable material with a preferably oblique cross-section **34** preferably is captured between the two wiping pieces **31** and **32**. These two wiping pieces **31** and **32** are industrially attached and pressed together, leaving an extending section **35** around the perimeter of the wiping component **60**. In this configuration, each wiping component **60** is permanently attached to its corresponding plate **18**, e.g., using a permanent glue, and plates **18** preferably are replaceably mounted onto section **17** of wiping arm **24** or **40**, or directly onto wiping arm **24** or **40**. See Figs. 15A-D. The fastening of plate **18** onto section **17** may be done in various ways, such as: by screwing it onto section **17**, in which case a screw thread preferably is integrated into both section **17** and plate **18**, or by simply pressing plate **18** onto section **17**, using a snap-fit construction. Different ways of fastening may be used and are within the scope of the invention. As shown, plate **18** preferably has an indented central portion into which the main portion of wiping component **60** may be seated, and

providing an outer lip **21** which is overlaid by extending section **35** of the wiping component **60**.

Configuration 80:

As shown in Figures 6-8, wiping component **80** preferably is comprised of
5 two pieces of fabric, reinforced cloth or other suitable wiping material **31** and **32**.
In this configuration **80**, wiping piece **31** has a small extending tab **52**.

This tab **52** is used to easily pull off the wiping component **80** when it
needs to be replaced. A soft pad, sponge material, or other suitable material with
a preferably oblique cross-section **34** is captured inside the two wiping
10 components **31** and **32**. These two wiping pieces **31** and **32** are industrially
attached and pressed together, leaving an extending section **35** around the
perimeter of the wiping component **80**. In this configuration, each wiping
component **80** is replaceably attached to its corresponding plate **18**, e.g., by
means of Velcro, paint glue, or any other non-permanent adhesive that is applied
15 onto the bottom of wiping material **32** or plate **18**. When the adhesive is applied
onto wiping component **80**, it preferably is covered by a strip (e.g., made of
paper or plastic) that first has to be peeled away before the wiping component **4**
can be replaceably fixed onto plates **18**. The paint glue, Velcro or other non-
permanent adhesive may instead be applied only onto the extending section **35**
20 of the wiping component **80**. Any other suitable detachable way of fixing may be
used. The plates **18** can be replaceably or permanently mounted onto section **17**
of wiping arm **24** or **40**, or directly onto wiping arm **24** or **40**. The fastening of
plate **18** onto section **17** of wiping arm **24** or **40** may be done in different ways
such as by screwing plate **18** onto section **17**; in this case a screw thread
25 preferably is integrated into both pieces **17** and **18**, or by simply pressing it onto
section **17**. Different ways of fastening may be used, and are within the scope of
the invention. As shown, plate **18** preferably has an indented central portion into
which the main portion of wiping component **80** may be seated, and providing an
outer lip **21** which is overlaid by extending section **35** of wiping the component.

30 **Configuration 100:**

As shown in Figures 6-8, wiping component **100** preferably is comprised
of two pieces of fabric, reinforced cloth or other suitable wiping material **31** and

32. A soft pad, sponge material, or other suitable material with a preferably oblique cross-section **34** preferably is captured between the two wiping pieces **31** and **32**. These two wiping pieces **31** and **32** are industrially attached and pressed together, leaving an extending section **35** around the perimeter of the wiping component **100**. In this configuration, each wiping component **80** is replaceably attached to its corresponding plate **18** by means of placing the fastener **55** over the edge of plate **18**. Fastener **55** will then press the extending edge **35** of wiping component **4** against the upper section of plate **18**. The fastening of part **55** onto plate **18** may be done in different ways such as by snapping it (using a snap-fit construction) or screwing it onto the side of plate **18**. In this latter case, a screw thread preferably is integrated into both components **55** and **18**. Different ways of fastening may be used, and are within the scope of the invention.

Fastener **55** may also be hinged **200** onto plate **18**. See Figure 17. When the wiping component has to be replaced, fastener **55** is opened by pulling fastener **55** pivotally upwards. The wiping component **100** can now be removed and replaced. A new wiping component **100** can be fixed onto plate **18**, by pivotally pulling fastener **55** downward. An easy fastening and opening engaging-clicking system **202A-B** in plate **18** and fastener **55** secures part **55** onto part **18**, pressing the extending edge **35** of the wiping component between both sides of components **18** and **55**. See Figure 17. Part **55** may be integrally formed with plate **18**, so as to be one part, or can be provided as a separate part that is pivotally hinged onto plate **18**. Plate **18** and fastener **55** preferably are permanently mounted on, or integrated into, the arms **24** or **40**. Different ways of fastening may be used, and are within the scope of the invention. In this particular configuration, both sides of wiping component **100** generally can be used. When one side is dirty, fastening part **55** is detached and wiping component **100** is turned around and detachably fixed onto plate **18**, again using fastening part **55**.

The plates **18** can be replaceably or permanently mounted onto section **17** of wiping arm **24** or **40**, or directly onto wiping arm **24** or **40**. The fastening of plate **18** onto section **17** of wiping arm **24** or **40** may be done in different ways such as by screwing plate **18** onto section **17**; in this case a screw thread preferably is integrated into both pieces **17** and **18**, or by simply pressing it onto

section **17**. Different ways of fastening may be used, and are within the scope of the invention. As shown, plate **18** preferably has an indented central portion into which the main portion of wiping component **100** may be seated, and providing an outer lip **21** which is overlaid by extending section **35** of wiping component

5 **100**.

In any of the embodiments described above, the arms **24** or **40** may be integrated into casing **10**, and therefore become one part. In this case, arms **24** or **40** generally will not be able to pivot. An example of a structure and operation to replaceably attach and detach the combination of a wiping component **4** and

10 plate **18** in this situation can be seen in Figures 15A-D.

Figure 15A illustrates a top perspective view of a combination of wiping component **4** and backing plate **18**. In this embodiment, backing plate **18** is comprised of two subcomponents, a main plate **18A** and a guiding section **18B** for inserting into the wiping arm **24** or **40**. In the present example, it is assumed

15 that wiping arm **40** is used. More specifically, as shown in Figure **15B**, guiding section **18B** permits backing plate **18** (with wiping component **4** attached) to be longitudinally slid onto arm **40**.

This is illustrated in more detail in Figures 15C-D, which show a bottom perspective view of guiding member **18B**. The main plate **18A** and wiping component **4** have been omitted in these figures in order to more clearly show the detachable attachment mechanism according to the preferred embodiment of the invention. As shown, the bottom of guiding member **18B** includes an elongated bottom element **125**, which fits between arms **120** of wiping arm **40**. Bottom element **125** preferably becomes narrower as it extends away from the

20 center of backing plate **18**. As a result, when initially inserted into wiping arm **40** bottom element **125** easily fits between arms **120** and enters grooves **121**. Then, the widening of element **125** causes it to first contact the edges of arms **120** and then to push arms **120** apart. Finally, when element **18B** is fully inserted (as shown in Figure 15D), element **125** clears arms **120**, causing them

25 to snap back into position and lock element **18B** into position. However, with sufficient force, element **18B** (with the main portion **18A** of backing plate **18** and wiping component **4** attached) can again be pulled out from arm **40**.

In the present embodiment, the grooves **121** and snap arms **120** are integrated into the arms **24** or **40**. See Figures 15A-D. When they have to be

removed, they are pulled longitudinally out of the groove 121. The snap arms 120 that are integrally formed with the arms 24 or 40, have a small open section 123, so they can resiliently bend outwards, this resilient effect is possible due to the resilient character of the material from which the arms 24 or 40 are
5 fabricated, such as any of various resilient plastics. The groove 121 and snap arms 120 may also be integrated into the backing plates 18, in this case backing plate 18 is longitudinally slid onto a corresponding section that is incorporated into the arms 24 or 40.

As also shown in Figures 15C-D, a hole 122 extends through guiding
10 element 18B and, although not shown, also through main plate 18A. This hole 122 allows fluid from hoses 56 to be provided to (or through) wiping component 4.

The above configuration for attaching the plates 18 onto the arms 24 or 40 (shown in Figures 15A-D) can be combined with any of the options of fixing
15 the wiping components 4 onto plates 18 (e.g., as described above for configurations 60, 80, and 100).

The snap-click components 120 (see Figures 15A-D) can be implemented into the plates 18, arms 24 (or 40) or in both. Although the shape, form and construction of such a system are described in a preferred embodiment, it may
20 be done differently. For example, plates 18 may be held in place by using a dovetail groove in arms 24 (or 40) or in plate 18, instead of the structure set forth in Figures 15A-D.

As seen in Figure 16, in a further embodiment of the invention, the casing 10, with integrated or separately pivoting arms 24 (or 40) may be longitudinally
25 divided into two parts. These two preferably injection-molded parts, which comprise casing 10 and arms 24 (or 40) integrated in one part 160, are hinged to each other with the hinged construction 124 that attaches both parts 160 together, enabling them to open, so a cleaning liquid capsule or spray-dispenser can be inserted or replaced. Such a configuration also makes it possible to
30 replace the wiping components 4 without having to detach plates 18.

In this embodiment of the invention, the capsule 12 or spray dispenser can be injected longitudinally (see Figure 16, element 164) into the device 110. One of the parts 160 is closed against the other by swinging it over the other part 160, with lower section 166 of one of the parts 160 closing the device. Capsule

12 is now blocked and sealed off. The closing of both halves **160** can also be done by putting a closing cap **180** over the device **110**. See Figure 16. The liquid capsule or spray-dispenser is inserted in the designated place in the device **110**. See Figure 16. Then, both parts **160** (each comprising a wiping arm **24** or **40** and a casing **10**) are closed by clicking them together, using an easy-to-open-and-close snap-click engagement **168**. The storage cover **30** then can be placed over the device **110** when not in use.

In this specific embodiment, casing **10** and wiping arm **24** or **40** can be one injection-molded part **160**. Alternatively, the device may use separate parts **10** and **24** (or **40**).

The spare wiping components may be stored away in either or both of the parts **160**, or in the storage container **30**.

Although the spray-dispenser and/or pump **20** and the spray head **13** is generally illustrated in the preferred position, it may be positioned instead at the end of the device.

Both parts **160** may also be separately clicked onto each other without being attached by the hinges **124**.

Although the invention is set forth and described in a preferred embodiment, it may be different. For example, casing **10** and wiping arm **24** or **40** may be molded into a single unitary piece **160**. In such an embodiment, the limbs **19** generally will not be necessary. The preferred embodiment is thus illustrative and not restrictive.

Eyeglass cleaning is performed by placing the two (preferably rotating) arms **24** or **40** over the lens, pressing the arms and wiping components against both sides of the spectacle lens, and then wiping off the lens by means of making a rotating or other appropriate movement. Figure 9 illustrates a perspective view of the device **1** with cleaning fluid being sprayed from the spray button **13** onto the spectacle lens. Figure 14 shows a perspective view of the device **38** according to the second embodiment of the invention, with liquid being atomised or sprayed through the wiping component on each side of the spectacle lens. After the eyeglass is cleaned, the arms **24** or **40** are compressed inwardly and the protection cap **30** is placed over the device **1** or **38**.

Structural and Functional Variations.

The disclosure above generally describes certain specific embodiments of the present invention. In addition, the following variations on those embodiments also are possible.

- 5 • Springs **11** (or other types of springs, e.g., leaf springs instead of coil springs) may instead be integrated into either or both of casing **10**, on the one hand, and wiping arms **24** or **40** (See Figure 2B), on the other. That is, they may be integrated into the molded parts **24**, **40** or **10** and be of the same material, so as to be integrally formed. Still further, the spring biasing effect may be
10 achieved by making either or both of such components from a spring-like material.
- Another embodiment of the invention utilizes a conventional spray dispenser bottle (typically having a combined pump and fluid container) that is stored into part **10**. Alternatively, as noted above, an electric pump or pressurized
15 system (e.g., aerosol) may instead be used.
- The spare wiping components **4** instead may be stored in a compartment in the storage cover **30**. Alternatively, they may be stored in a separate cap/container that is detachably attached (e.g., clicked onto) storage cover **30**.
- 20 • Plates **18** may be integrated into the molded arms **24** or **40** so as to become one part.
- Cover/container **22** may have a section inside that receives capsule **12**, and where the capsule **12** can be replaceably fixed. For example, capsule **12** may have a screw thread on the lower outside that interconnects with a screw
25 thread on the inside of cover/container **22**. In such an embodiment, when a new capsule has to be inserted, it is placed, turned into cover/container **22** in a way that a section of the capsule **12** extends long enough to leave a good hand-grip extension for when it has to be taken out of cover/container **22**. Now, cover/container **22** with the capsule inside is clicked into and over
30 casing **10**. The screw thread may also be replaced by fastening capsule **12** into part **22** by means of pressure, e.g., using a snap fit.

- The device **1** or **38** can be configured so that when cap **8** is removed from casing **10**, capsule **12** extends away from the lower side of casing **10**, so it can be easily grabbed to pull it outwardly.
- The cleaning liquid may also be poured directly into the open section of part **10**. This may be done by means of a liquid capsule with a burstable top section that is pressed and placed onto a connecting section on the lower side of part **10**. The cleaning liquid in the disposable capsule is now poured into the open section of part **10**. Then, the lower end side of part **10** is sealed off with a closing cap, for example, cap **8**.
- The liquid capsule **12** may be secured by both parts **8** and **22**, or by only one of these parts. In addition, parts **8** and **22** are described in a preferred embodiment; however they may be engineered in other different shapes and different ways of securing them (screw-thread, clicking system, snap-fit or other suitable system) may be utilized.
- The extending section **15** of cover/container **22** may overlap the rotating arms **40**, so the arms **40** stay straight, and don't open when pulling of the container **30**. Then, when cover/container **22** is pulled backwards, the two arms **40** will open automatically, due to the biasing effect of the springs **11**, allowing access to the wiping components **4**, and facilitating replacement of them. The above-described features of cover/container **22** may also be directly integrated into casing **10**.
- The liquid capsule **12** may also be fixed and inserted directly into the lower section of pump **20** without casing **10** capturing it. It also (or instead) may be replaceably attached with a snap-fit click engagement or any other suitable detachable fixing construction onto the front section of casing **10**, without the hollow wall set forth in the drawings capturing capsule **12**.
- The cleaning liquid may be transferred and applied onto the wiping components by means of atomising it, or also (or instead) by means of drop-wise emitting cleaning liquid via the pump **20**, through the hose **56** and then through nozzle/atomizer section **62**. In this case, when pressing the activation button **39** for pump **20**, a drop of cleaning liquid will be absorbed by the wiping components. Accordingly, the liquid transfer from the capsule **12** may be done by atomizing it, by drop-wise emitting it or by spraying it.

- Each wiping component **4** may have an opening in the middle for facilitating spraying or atomizing of the cleaning fluid onto the eyeglass spectacle or instead may also be a closed wiping component without such a hole in it. The cleaning liquid may be applied onto a single side of the eyeglass, onto both
5 sides of the eyeglass, or directly into the wiping components.
- The hoses **56**, in the embodiments where they are used, may be integrated into the wiping arms **40**. This may be done by integrating these channels into the molded parts **40**, or in any other possible and suitable manner. Alternatively, arms **40** may be provided with a guide into which hoses **56** are
10 fitted.
- The positioning and shape of either or both pump **20** and button **13** (or **39**) may from the embodiments described above, in any of a variety of different ways.
- Although wiping components **4** and plates **18** are described above and
15 shown in the figures as having a preferred shape, they may have any other suitable shape or form.
- The attachment features described above can be used and implemented in any or all variations and embodiments of the present invention.
- Another embodiment of the invention is the possibility of placing two wiping
20 components onto each of arms **24** (or **40**) or section **17** of arms **24** (or **40**), one sponge and one wiping component, or both integrated into each other.
- Section **17** of arm **24** (or **40**) with the atomizer cap **58** may also stand alone without the wiping components **4** and plates **18** fixed to it. In this embodiment, the wiping components **4** and plates **18** are mounted onto the
25 arms **24** (or **40**) at a lower or higher position onto the arms **24** (or **40**), so that the integrated atomizer mechanisms **17**, **62**, and **58** stand alone and can directly atomize cleaning liquid onto both sides of the eyeglass.
- Applying the above-described aspects of the present invention, including the system of the arms **24** (or **40**) with the wiping components **4**, onto an existing
30 eye-cleaner spray dispenser are intended to be within the scope of the present invention.
- The location, component and position where the spare wiping components **4** are stored may vary from embodiment to embodiment, e.g., in cap/container

14 and/or **22**, in storage cover **30**, in casing **10**, or in any other suitable place or component.

- It is noted that the function and section **3** onto part **22** may also (or instead) be implemented into part **10**.

- 5 • The ornamental shape, design and overall look of the said constructions and embodiments are to be considered in all respects as illustrative and not restrictive. Although they have been described above by reference to a preferred embodiment, it will be appreciated that other constructions may be devised, which are nevertheless within the scope and spirit of the invention.

10 The embodiment described above is not to be considered restrictive.

Additional Considerations.

In the description above, several different embodiments of the present invention are discussed. However, certain features of the invention are particularly useful and are worth emphasizing. In certain the preferred
15 embodiments, the wiping arms are outwardly biased, either using a separate spring (preferably in connection with a pivot joint) or by forming the arms themselves and/or the casing of a spring-like material, with the arms projecting outwardly in their nominal orientations.

It is also preferred that a device according to the present invention
20 includes a cleaning fluid receptacle and a means for forcing the cleaning fluid out of the device through a nozzle (preferably between the two wiping arms), out of the device as a spray or mist out through the wiping components (e.g., using hoses to transmit the cleaning fluid to the wiping components), or into the wiping components themselves (e.g., again using hoses). This may be accomplished
25 using a pump (manual or electric) to pressurize the cleaning fluid or by using a pressurized container (e.g., aerosol) of cleaning fluid. In the preferred embodiments, the fluid receptacle is replaceable separately from the pump or other pressurization mechanism and is rigid or at least substantially shape-retaining.

30 In either case, the activation button (or other means) for causing the cleaning fluid to be released under pressure preferably is located near the wiping arms. As a result, a device according to the present invention typically can be utilized fairly easily with one hand. It is also preferred that the activation means

the separate from the other components of the device, thereby allowing independent activation of the pressurization mechanism.

Preferably, the cleaning fluid receptacle is replaceable and disposable. This can be accomplished by using a container having a burstable seal that can
5 be pressed against the pump, thereby bursting the seal.

In addition, the wiping components (or pads) preferably also can be replaced independently of the backing or support plates (which may be permanently fixed or attached to the wiping arms). As a result, the backing or support plate can be reused, and many more wiping components can be storage
10 within the same volume of storage space.

In addition, several different embodiments of the present invention are described above, with each such embodiment described as including certain features. However, it is intended that the features described in connection with the discussion of any single embodiment are not limited to that embodiment but
15 may be included and/or arranged in various combinations in any of the other embodiments as well, as will be understood by those skilled in the art.

Similarly, in the discussion above, functionality may be ascribed to a particular module or component. However, unless any particular functionality is described above as being critical to the referenced module or component,
20 functionality may be redistributed as desired among any different modules or components, in some cases completely obviating the need for a particular component or module and/or requiring the addition of new components or modules. The precise distribution of functionality preferably is made according to known engineering tradeoffs, with reference to the specific embodiment of the
25 invention, as will be understood by those skilled in the art.

Thus, although the present invention has been described in detail with regard to the exemplary embodiments thereof and accompanying drawings, it should be apparent to those skilled in the art that various adaptations and modifications of the present invention may be accomplished without departing
30 from the spirit and the scope of the invention. Accordingly, the invention is not limited to the precise embodiments shown in the drawings and described above. Rather, it is intended that all such variations not departing from the spirit of the invention be considered as within the scope thereof as limited solely by the claims appended hereto.